



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/041,681	01/10/2002	Hiroshi Yamamoto	900-411	2957

23117 7590 08/15/2003

NIXON & VANDERHYE, PC
1100 N GLEBE ROAD
8TH FLOOR
ARLINGTON, VA 22201-4714

EXAMINER

DIAMOND, ALAN D

ART UNIT	PAPER NUMBER
----------	--------------

1753

DATE MAILED: 08/15/2003

9

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/041,681

Applicant(s)

YAMAMOTO ET AL.

Examiner

Alan Diamond

Art Unit

1753

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 17 July 2003.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-22 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1,3-6,8-11,13-18 and 20-22 is/are rejected.
- 7) ☒ Claim(s) 2,7,12 and 19 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 10 January 2002 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 7.
- 4) ☐ Interview Summary (PTO-413) Paper No(s) _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

Comments

1. The objection to the drawings has been overcome by Applicant's amendment of the specification.
2. The 35 USC 112, second paragraph, rejection of claims 3, 4, and 9-22 has been overcome by Applicant's amendment of the claims.
3. The 35 USC 102(b) and 103(a) rejections over JP 11-274530 (JP '530) have been overcome by Applicant's amendment of claims 1 and 11 so as to require that the holes are provided on the surface of the transparent conductive layer in an amount of from 0.5 to 2 holes per micro square meter. JP '530 does not teach or suggest 0.5 to 2 holes per micro square meter, and there is no good reason to believe that this feature is inherent in any of JP '530's examples. Indeed, in Example 1, JP '530 sputters its first ZnO transparent conductive layer, with non-illustrated sputtering equipment, and does not even etch the ZnO layer.
4. The provisional obviousness-type double patenting rejection over the claims of copending application 09/984,905 has been overcome Applicant's amendment of instant claims 1 and 11 so as to require that the holes are provided on the surface of the transparent conductive layer in an amount of from 0.5 to 2 holes per micro square meter. There is nothing in the claims of said copending application that would have led a skilled artisan to the 0.5 to 2 holes per micro square meter range.

Claim Objections

Art Unit: 1753

5. Claim 21 is objected to because of the following informalities: In claim 21, at line 5, the term "a second transparent conductive layer" should be changed to "the second transparent conductive layer". Appropriate correction is required.

Claim Rejections - 35 USC § 102

6. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

8. Claims 1, 3-6, 8-11, 13-18, and 20-22 are rejected under 35 U.S.C. 102(e) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over Wada et al, U.S. Patent Application Publication 2002/0050289. Applicant cannot rely upon the foreign priority papers to overcome this rejection because a translation of said papers has not been made of record in accordance with 37 CFR 1.55. See MPEP § 201.15.

Wada et al teaches a thin film solar cell comprising a substrate (11a); a transparent conductive layer (11c or 11d) and a pin photoelectric conversion layer comprising n-type layer (12), i-type crystalline silicon layer (13); and p-type layer (14),

Art Unit: 1753

wherein as seen in Figures 1 and 2, the transparent conductive layer (11c or 11d) clearly has a plurality of holes on its surface of the side of the photoelectric conversion layer, and said holes have irregularities at their surface (see also paragraphs [0044] through [0055]). Figure 3 shows a multijunction thin-film solar cell having glass substrate (11a); first transparent conductive layer (11d), first photoelectric conversion layer (32) having p-type, i-type and n-type amorphous layers; a second transparent conductive layer (33), and a second photoelectric conversion layer 34 having an i-type crystalline silicon layer (see also paragraphs [0212] through [0223]). Note that said first transparent conductive layer (11d) and said second transparent conductive layer (33) have the claimed holes and irregularities (see Figure 3). It is the Examiner's position that the transparent conductive layers having holes prepared in Examples 1 to 9 of Wada et al inherently are present in an amount of 0.5 to 2 holes per micro square meter as here claimed. In Wada et al's Examples 1, 4, and 7, the ZnO transparent conductive layer is etched by immersing in a 0.5 weight % hydrochloric acid aqueous solution at a liquid temperature of 25°C for 30 seconds, and then rinsing thoroughly with water. Examples 2, 3, 5, 6, 8, and 9 use 45 seconds for the immersion, rather than 30 seconds. It is the Examiner's position that the limitations in instant claims 3 and 4 concerning hole diameter and depth, and irregularity difference in height, are inherently present in, for example, the solar cells prepared in Wada et al's Examples 1 to 6. Furthermore, it is the Examiner's position that the limitations in instant claims 13, 14, 15, and 17 concerning hole diameter and depth, and irregularity difference in height, are inherently present in, for example, the solar cells prepared in Wada et al's Examples 7

Art Unit: 1753

to 9. Since Wada et al teaches the limitations of the instant claims, the reference is deemed to be anticipatory.

In addition, the presently claimed limitation that the holes are provided on the surface of the transparent conductive layer in an amount of from 0.5 to 2 holes per micro square meter would obviously have been present once the etched ZnO transparent conductive layers of Wada et al's Examples 1 to 9 are provided. Note In re Best, 195 USPQ at 433, footnote 4 (CCPA 1977) as to the providing of this rejection under 35 USC 103 in addition to the rejection made above under 35 USC 102.

In addition, the instantly claimed limitations concerning hole diameter and depth, and irregularity difference in height, would obviously have been present once Wada et al's thin-film solar cells in Examples 1 to 9 are provided. Note In re Best, 195 USPQ at 433, footnote 4 (CCPA 1977) as to the providing of this rejection under 35 USC 103 in addition to the rejection made above under 35 USC 102.

Response to Arguments

9. Applicant's arguments filed July 17, 2003 have been fully considered but they are not persuasive.

Applicant argues that claim 1 has been amended so as to require that the holes are provided on the surface of the transparent conductive layer in an amount of from 0.5 to 2 holes per micro square meter. However, this argument is not deemed to be persuasive, because, as noted above, it is the Examiner's position that the transparent conductive layers having holes prepared in Examples 1 to 9 of Wada et al inherently are present in an amount of 0.5 to 2 holes per micro square meter as here claimed. In

Art Unit: 1753

Wada et al's Examples 1, 4, and 7, the ZnO transparent conductive layer is etched by immersing in a 0.5 weight % hydrochloric acid aqueous solution at a liquid temperature of 25°C for 30 seconds, and then rinsing thoroughly with water. Examples 2, 3, 5, 6, 8, and 9 use 45 seconds for the immersion, rather than 30 seconds.

Applicant cites the data in Tables 2 and 4 of the instant specification and argues that it has "surprisingly been found that a number density of holes within the claimed range (i.e., 0.5 to 2) leads to unexpected results." However, this argument is not deemed to be persuasive because none of the data in said Tables 2 and 4 represents a fair comparison with Wada et al. None of the instant comparative data uses Wada et al's methods for etching the ZnO layer as in Wada et al's Examples 1 to 9.

Allowable Subject Matter

10. Claims 2, 7, 12, and 19 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Conclusion

11. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not

Art Unit: 1753

mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

12. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Alan Diamond whose telephone number is 703-308-0840. The examiner can normally be reached on Monday through Friday, 5:30 a.m. to 2:00 p.m. ET.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nam Nguyen can be reached on 703-308-3322. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-0661.

A handwritten signature in black ink, appearing to read 'Alan Diamond', with a stylized, cursive script.

Alan Diamond
Primary Examiner
Art Unit 1753

Alan Diamond
August 14, 2003